

Method and system for stereoscopic representation

The invention refers to a method and to a system used for stereoscopically representing a subject

5 Generally, for the stereoscopic representation of a subject, it is required to have a) two rows of a sequence of pictures, taken at consecutive time, one from the position of the observer's left eye, and one from the observer's right eye (see **Figure 1**), and b) the appropriate equipment for their projection.

10 Stereoscopy is being differentiated in two modes: direct and indirect. In direct mode, every signal corresponding to an image is being directed to the appropriate display of the corresponding eye (see **Figure 2**). In indirect mode (**Figure 3**), the two signals – consisting of the images for the left and right eye – are being composed in a single image which is projected in a single screen, and the user receives the corresponding
15 original images through a pair of glasses that perform the decomposition.

Indirect stereoscopy in turn, is being differentiated in active and passive stereoscopy. In the first one, the two signals are being swapped several times in a single second, and the user watches through the appropriate glasses each image alternately; once for the left eye and once for the
20 right, whereas the glasses shutter each eye alternately with the same frequency. In passive stereoscopy, both signals are projected with opposite polarization (usually horizontal-vertical), and the user wears polarizing glasses to decompose the two signals in two different images.

25 Using the available technology in computers and projection systems, stereoscopic representation is being achieved through the projection of two signals, consisting of the images for the left and right eye. Up until

now, in personal computers, the above process has been implemented using the main output of the PC's graphics card, where the two signals carrying the two images are coming out alternately, either line by line (interlaced) or image by image (page swapped). A splitter has been used
5 to divide the two independent images, and divert them to the appropriate display device.

According to the current invention, no splitter is required to produce the same effect, thus saving the user from buying extra hardware, which is highly priced and reduces the quality of the final resulting effect.

10 The invention is specified in claim 1. Claims from 2 up to 7, describe additional parameters, which lead to more benefits.

The invention, according to claim 1, turns to advantage the capability that a personal computer's operating system has, in splitting an image in several ones, in cooperation with graphics cards equipped with two
15 separate outputs. A software application has been developed to produce a high-resolution image, which is projected in multiple vertically or horizontally tiled monitors, without stereoscopic projection though.

An example of the invention, referencing figures 1 to 5, is laid out beneath

20 The way of representing a stereoscopic subject is introduced in figure 1.

In figures 2 and 3, active and passive stereoscopy is presented schematically.

A personal computer required for the implementation of the invention is presented in figure 4.

Finally, the method of producing the images, according to the current invention, is schematically introduced in figure 5.

For the stereoscopic representation of a subject (10), according to the current invention, nothing more than a simple personal computer (40), a
5 common operating system (50), a graphic card with dual display (70) and the appropriate software (60) is being required. The one and united image (100) that the specific software creates, and which comprises from the two images (80, 90) homological to images (20, 30), is driven through two signals (85, 95) in a screen (120, 150), where the user may
10 stereoscopically observe the subject. In the case of direct stereoscopy the images are driven in two displays (120), whereas in indirect stereoscopy the images are driven in a single display (150).

With the current invention, we are able to produce both direct and indirect stereoscopy. The picture generated by the personal computer
15 (100) using the specific software (60) is integral, with resolution $2a \times b$ where a and b is the resolution of the right and left displays (120, 150). The image corresponding to the left eye (80), is positioned in the half left part of the total image (100), and – similarly – the image corresponding to the right eye image (90) is placed on the other (right) half part (100).
20 Using any modern graphic card which has dual output (70), and through the appropriate configuration in the Microsoft Windows operating system (50), the original image of resolution $2a \times b$ is split in half (85,95) and redirected to the two outputs, which send these two signals (85,95) in the corresponding projection displays (120 or 150) of $a \times b$ resolution
25 each.

The two images (20,30) can be either naturally captured by a camera, or technically generated by a computer from a virtual solid model. In both cases, the images are packed in a single file and stored in electronic media, through a specific file protocol (format). The current invention

may be used for stereoscopic representation of sequenced image pairs of any type; static, rate filled and real timed. These pairs are either generated in a specific file format, or converted to it from commonly used video formats (e.g. avi). This allows us to create stereoscopic movie films
5 for the cinema, either in video or DVD format. The two streams for the video may be either naturally shot using two cameras, or technically generated from virtual models in personal computers, as walkthrough animations.

Figure explanation

- 10 (10) the subject to be represented stereoscopically
- (15) the spot where the two cameras capturing the subject focus/target to
- (20) the picture captured from the position of the left eye
- (25) the camera for the left eye
- 15 (30) the picture captured from the position of the right eye
- (35) the camera for the right eye
- (40) common personal computer
- (50) Microsoft Windows operating system
- (60) software
- 20 (70) graphic card with dual output
- (80) left eye image

- (85) signal of left eye image
- (90) right eye image
- (95) signal of right eye image
- (100) The integral picture, generated by the specific software
- 5 (110) glass type dual projection system
- (120) small size – high resolution monitor (one for each eye)
- (130) Converge case, for system of twin projectors
- (140) Projector, for computer signal output
- (150) Monitor for simultaneous projection of two images